

## In-flight Performance of the Water Vapor Monitor Onboard the SOFIA Observatory

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NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) airborne observatory flies in a modified B747-SP aircraft in the lower stratosphere above more than 99.9% of the Earth's water vapor. As low as this residual water vapor is, it will still affect SOFIA's infrared and sub-millimeter astronomical observations. As a result, a heterodyne instrument has been developed to observe the strength and shape of the 183GHz rotational line of water, allowing measurements of the integrated water vapor overburden in flight. In order to be useful in correcting the astronomical signals, the required measured precipitable water vapor accuracy must be 2 microns or better, 3 sigma, and measured at least once a minute. The Water Vapor Monitor has flown 22 times during the SOFIA Early Science shared-risk period. The instrument water vapor overburden data obtained were then compared with concurrent data from GOES-V satellites to perform a preliminary calibration of the measurements. This presentation will cover the results of these flights. The final flight calibration necessary to reach the required accuracy will await subsequent flights following the SOFIA observatory upgrade that is taking place during the spring and summer of 2012.

### Plain Language Abstract

NASA's SOFIA airborne observatory flies in the lower stratosphere above more than 99.9% of the Earth's water vapor. As low as this residual water vapor is, it will still affect SOFIA's astronomical observations. As a result, an instrument has been developed to measure the integrated water vapor overburden in flight.